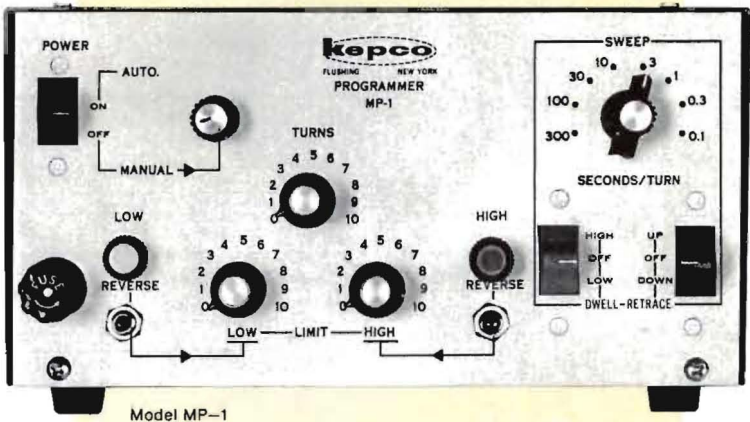


NEW KEPCO PRODUCTS for '67



KEPCO
MOTORIZED
PROGRAMMERS
MECHANICAL
FUNCTION GENERATOR



Models MP-1 and MP-10 are mechanical drives for a 10-turn servo-mount potentiometer installed within. A synchronous motor drives the shaft through an 8-speed gear-box with adjustable limits.

MODELS	SECONDS PER REVOLUTION (MAXIMUM: 10 REVOLUTIONS, 3600°)								PRICE
MP-1	0.1	0.3	1.0	3.0	10.0	30.0	100.0	300.0	\$595.00
MP-10	1.0	3.0	10.0	30.0	100.0	300.0	1000.0	3000.0	595.00

TIMING ACCURACY: ± 5% referenced to 60 cps line frequency.

INPUT: 105-125V AC, 60 cps

LIMITS, (Mechanically Adjustable):

Low Limit: Range from 0-9¾ turns.

High Limit: Range from ¼ to 10-turns.

Minimum Sweep Range: ½ turn (120°)

OVERIDE: Manual override buttons reverse the sweep at any desired point—or manually stop the programmer.

DIRECTION SIGNALS: Pilot lights signal the direction of sweep up and down. With dwell and retrace off, sweep cycles symmetrically between limits.

DWELL: Stops the sweep at either the high or low limit, (selectable).

RETRACE: Selector causes the sweep to retrace up or down at maximum speed—no matter what the speed selected.

AVAILABLE POTENTIOMETERS: Any ¼" shaft, ⅝" servo-mount potentiometer. Standard values: 10, 25, 50, 100 and 500 ohms; 1, 2, 5, 10, 30, 50, 75, 90, 100 and 125 kilohms. Other resistance values on special order.

TERMINALS: Rear mounted barrier strip contains speed changing connections: high and low limit contacts, dwell and retrace, and the output of the linear potentiometer.

DIMENSIONS: 4¼"H x 9½"W x 9½"D.

FINISH: Panel: Per FED. STD 595. Color 26440, (light gray).
Case: Gray hammertone.

MOUNTING: Bench style, single and dual rack mounting adapters available.

Data subject to change without notice
PATENT NOTICE: Applicable Patent Nos will be supplied on request.

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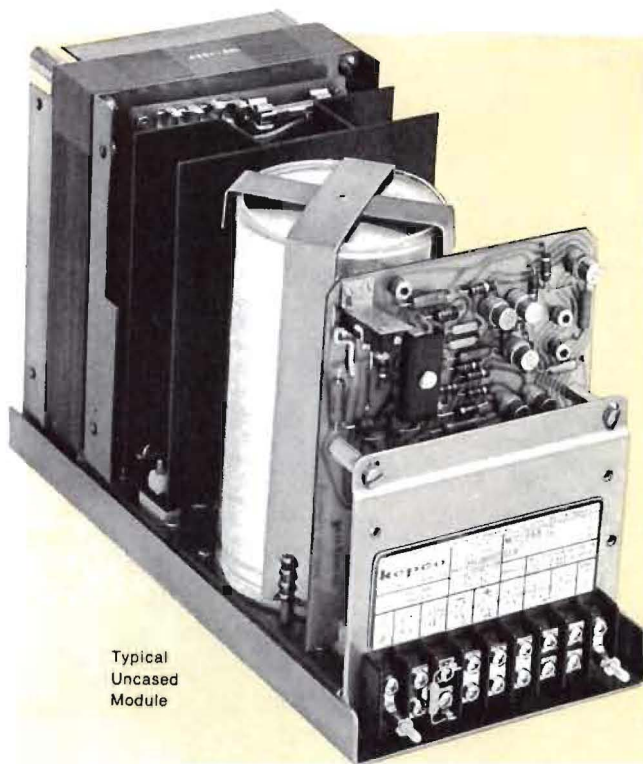


KEPCO

PAR

MODULAR POWER SUPPLIES

- overload current cutoff
- out-of-band programming
- precision regulator
- conventional transformer



Typical
Uncased
Module

MODEL	OUTPUT VOLTS	OUTPUT CURRENT at ambient temp		OUTPUT IMPEDANCE			PRICE
		65°C 55°C	40°C 30°C	Ohms DC to 100 cps	Microhenries 100 cps to 1 kc	1 kc to 100 kc + μ h	
PAR-4	4 \pm 5%	0-9.0	0-11.0	0.0001	0.005	0.1 + 0.5	\$195.00
PAR-7	7 \pm 5%	0-8.0	0-10.0	0.0001	0.005	0.1 + 0.5	195.00
PAR-12	12 \pm 5%	0-5.5	0-7.0	0.0002	0.005	0.1 + 0.5	195.00
PAR-15	15 \pm 5%	0-4.6	0-6.0	0.0003	0.005	0.1 + 0.5	195.00
PAR-24	24 \pm 5%	0-3.4	0-4.0	0.0006	0.005	0.1 + 0.5	195.00
PAR-28	28 \pm 5%	0-3.1	0-3.7	0.0008	0.005	0.1 + 0.5	195.00
PAR-36	36 \pm 5%	0-2.3	0-2.8	0.0015	0.005	0.1 + 0.5	195.00
PAR-48	48 \pm 5%	0-1.8	0-2.3	0.0022	0.005	0.1 + 0.5	195.00
PAR-60	60 \pm 5%	0-1.5	0-2.0	0.003	0.005	0.1 + 0.5	195.00

† Uncased †† Cased

SPECIFICATION	VOLTAGE MODE	CURRENT MODE** (External Sensing)
OUTPUT RANGE	\pm 5% †	1 mA to I_{limit} cutoff locus
REGULATION, LINE	< 0.005%	< 0.005% at rated sample**
REGULATION, LOAD	< 0.01% or 0.5 mV*	< 0.01% at rated sample** †
STABILITY (8 HR.)	< 0.02% or 2 mV*	< 0.02% or 1 mA
TEMP. COEFFICIENT	< 0.02% per °C	< 0.02% per °C at rated sample**
RIPPLE, rms	< 0.25 mV	< 0.01% of I_0 max.

*whichever is greater

**Rated sample is 1 volt across external current sensing resistor with external current control.

†Adjustable to zero with corresponding current derating (see operating region graph).

‡The compliance voltage range lies within shaded operating region from the I_{limit} locus to 105% E_0 max.

INPUT: 105-125V AC or 210-250V AC, (selected), 50-440 cps single phase; approximately 2 amperes, 200 watts.

TEMPERATURE, AMBIENT OPERATING: Uncased: -20°C to $+65^{\circ}\text{C}$ maximum (see rating chart). Cased: -20°C to $+55^{\circ}\text{C}$ maximum (see rating chart).

TEMPERATURE, STORAGE: -40°C to $+85^{\circ}\text{C}$.

COOLING: Convection.

ISOLATION VOLTAGE: 500 volts to chassis.

CONTROL/PROGRAMMING: \pm 5% internal trimmer (voltage or current). External resistance programming ratio is 1000 ohms per volt. A 1% fixed resistor is supplied to program the tabulated nominal voltage. When programmed below the \pm 5% output band, derate current per operating region graph.

VOLTAGE RECOVERY (for step load current): < 50 μ seconds.

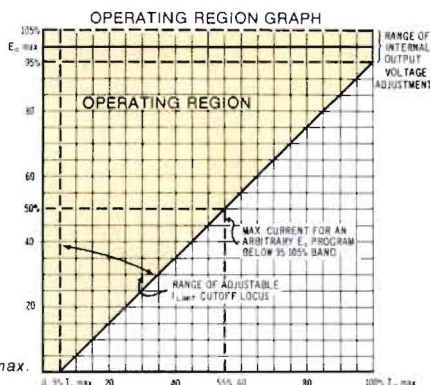
OVERLOAD CURRENT CUTOFF: Adjustable cutoff locus pivots about the $E_0 \approx 0$, $I_0 \approx 5\%$ point, reducing the output current into an overload. Note: Nonlinear loads drawing a high starting current may be locked out by the cutoff locus, and require a starting resistance to be contained within the shaded regions of the operating region graph.

Data subject to change without notice.
PATENT NOTICE: Applicable Patent Nos.
will be supplied on request.

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REMOTE ERROR SENSING: Compensates for up to 0.5 volt drop per output lead.

OVERSHOOT: (Turn-on/off): None in \pm 5% operating band. When output is set below 25%, load to approximately 10% to maintain negligible overshoot.

SERIES/PARALLEL: Connections are provided for parallel operation of identical units. Series operation to rated isolation.

OVERVOLTAGE PROTECTOR: Provision is made for attachment of an optional crowbar overvoltage protector, type VP-PAR. See accessory listing for detailed description of protector.

TERMINALS: All input, output, sense and control connections are made via a single multiterminal barrier strip.

DIMENSIONS: Uncased: 6 $\frac{1}{4}$ "H x 4 $\frac{1}{4}$ " W x 10 $\frac{1}{4}$ "D.
Cased: 6 $\frac{1}{2}$ "H x 5" W x 10 $\frac{1}{4}$ "D.

FINISH: Case: Royal blue epoxy.

MOUNTING: Rack mounting panel adapters available.





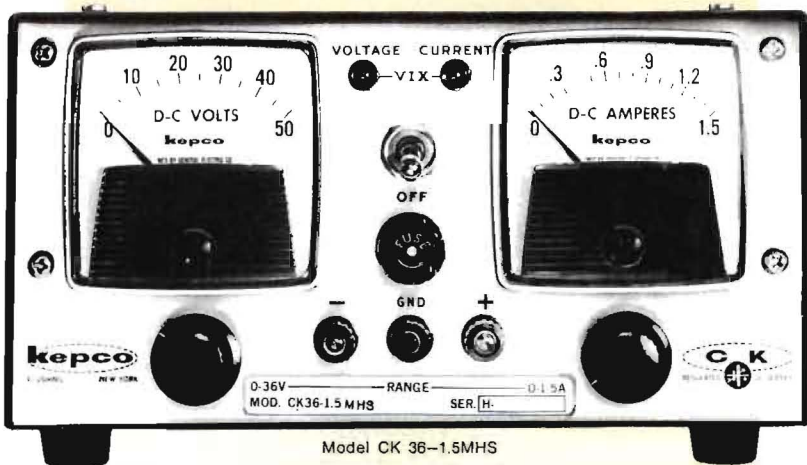
KEPCO

CK-HS

UNIPOLAR AMPLIFIER

POWER SUPPLIES

- fast slewing
- automatic crossover
- adjustable offsets



MODEL	DC OUTPUT RANGE		MAX. INPUT AMPS at 125V AC	PRICE
	VOLTS	AMPS		
CK 8-5MHS	0-8	0-5	1.2	\$390.00
CK 18-3MHS	0-18	0-3	1.3	350.00
CK 36-1.5MHS	0-36	0-1.5	1.5	350.00
CK 40-0.8 MHS	0-40	0-0.8	1.0	312.00
CK 60-0.5MHS	0-60	0-0.5	1.0	350.00

PARAMETER	VOLTAGE REGULATION	CURRENT REGULATION (Internal Sensing)	VOLTAGE AMPLIFIER OFFSETS**	
			ΔE_{IO}	ΔI_{IO}
OUTPUT RANGE	0-100% E_O max.	0.2%-100% I_O max.	—	—
LINE: 105-125/210-250V AC	<0.005% or 0.1 mV*	<0.005% or 0.2 mA*	<100 μ V	<10 nA
LOAD: No load/full load	<0.01% or 0.5 mV*	<0.01% or 0.2 mA*	<100 μ V	<10 nA
TIME: 8 hours (Stability)	<0.01% or 2.0 mV*	<0.05% or 1 mA*	<100 μ V	<10 nA
TEMP: Per °C (Coefficient)	<0.01%	<0.05% of I_O max.	<500 μ V	<50 nA

*whichever is greater
** E_{IO} is the offset voltage and I_{IO} is the offset current referred to the input of the voltage comparison amplifier.

DC VOLTAGE GAIN: More than 90 db.

OUTPUT SLEWING RATE: >100,000 volts/second (0.1V/ μ sec.) measured as the slope of the chord to the first time constant on the exponential response.

SINUSOIDAL FREQUENCY RESPONSE: $f_{max} = \frac{32}{E_{pp}}$ kc.
(E_{pp} is the peak-to-peak voltage excursion.)

MAXIMUM CAPACITANCE LOADING: 0.001 microfarads. Excess capacitance slows response and causes peaking of response and instability. Adjustable lag networks provide for small range of load reactance.

RIPPLE: 60 db below peak output, or 10 mV rms (grounded).

TRANSIENT RESPONSE: Voltage mode (for step load current) recovery is an exponential with a 50 microsecond time constant. Current Mode (for step load voltage) recovery is at the rate of 0.1 volts per microsecond.

OUTPUT IMPEDANCE: At DC $Z_O = \Delta E_O/I_O$; dynamically, add the reactive impedance of 5 millihenries.

OFFSET NULLING: The initial part of the input offset voltage and input offset current can be nulled with internal controls.

REFERENCES: Two; +6.2V and -6.2V; maximum current 1 mA.

AUTOMATIC CROSSOVER: Selects voltage regulation or current regulation operating mode automatically.

VIX* CIRCUIT: Mode indicators display operating conditions, also produce a $\pm 8V$, ± 1 mA control signal.

REMOTE ERROR SENSING: Compensates up to 0.5V drop per output lead.

PROGRAMMING: 1 mA control current, by resistance at 1000 ohms per volt. May be operationally controlled as an amplifier using external voltage or current signals; common negative.

INPUT: 105-125V AC or 210-250V AC (selectable), 50-65 cps single phase.

TEMPERATURE, AMBIENT OPERATING: -20°C to +50°C.

TEMPERATURE, STORAGE: -40°C to +85°C.

COOLING: Forced lateral circulation, built-in blower.

ISOLATION VOLTAGE: 500 volts to chassis.

CONTROLS: 10-turn voltage and current controls, 0.05% resolution.

METERS: Suffix "M" designates a pair of 2½", 2% meters. Delete the "M" from the suffix to specify an unmetred unit.

TERMINALS: Binding posts on front panel, plus, minus, and ground. Sixteen (16) terminal barrier strip on the rear contains output, sensing, and control terminals.

DIMENSIONS: 4¼"H x 8½"W x 13½"D. Half-rack. Mounting accessories available.

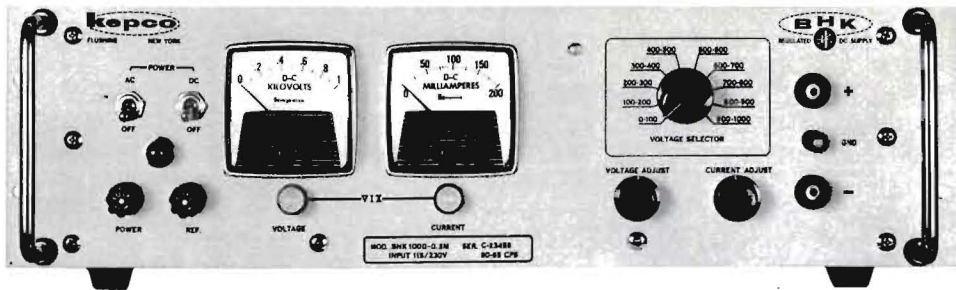
FINISH: Panel: brushed aluminum; Housing: gray hammer-tone.

Data subject to change without notice.
PATENT NOTICE: Applicable Patent Nos. will be supplied on request.

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KEPCO BHK HIGH VOLTAGE POWER SUPPLIES

- fast slewing capability
- operationally controlled
- hybrid design
- 10-turn voltage and current controls

MODEL	DC OUTPUT RANGE		OUTPUT IMPEDANCE			PRICE
	VOLTS	AMPS	Ohms + Microhenries	DC-100 cps	0.1-1kc	
BHK 500-0.4M	0-500	0-0.4	0.13	0.1	0.2 + 0.5	\$740.00
BHK 1000-0.2M	0-1000	0-0.2	0.5	0.1	0.2 + 0.5	740.00
BHK 2000-0.1M	0-2000	0-0.1	2.0	0.1	0.2 + 0.5	740.00

SPECIFICATIONS	VOLTAGE REGULATION	CURRENT REGULATION (Internal Sensing)	VOLTAGE AMPLIFIER OFFSETS**	
			ΔE_{io}	ΔI_{io}
OUTPUT RANGE:	0-100% E_o max.	0.2%-100% I_o max.	—	—
LINE: 105-125/210-250V AC	<0.005% or 1 mV*	<100 μA	<1 mV	<10 nA
LOAD: No load/full load	<0.01% or 1 mV*	<100 μA	<1 mV	<10 nA
TIME: 8 hours (Stability)	<0.01% or 2.0 mV*	<0.01% or 20 μA *	<50 μV	<50 nA
TEMP: Per °C (Coefficient)	<0.01%	<0.05% of I_o max.	<100 μV	<50 nA
RIPPLE: rms (Normal Speed)	<1 mV	<100 μA	—	—

*whichever is greater.

** E_{io} is the offset voltage and I_{io} is the offset current referred to the input of the voltage comparison amplifier.

DC VOLTAGE GAIN: More than 100 db.

OUTPUT SLEWING RATE: (Fast slewing connection): Greater than 500,000 volts per second, measured as the chord to the first time constant on the exponential response.

SINUSOIDAL FREQUENCY RESPONSE:

Fast Slewing Connection: $f_{max} = \frac{160}{E_{pp}}$ kc.

(E_{pp} is the peak-to-peak excursion).

RIPPLE, Fast Slewing Connection:

Ungrounded: More than 60 db below peak output.

Grounded: More than 100 db below peak output.

TRANSIENT RESPONSE:

Voltage Mode, Fast Slewing: For step load current, recovery is an exponential with a 50 microsecond time constant.

Current Mode, Fast Slewing: For step load voltage, recovery is at the rate of 0.5 volt per microsecond.

Voltage Mode, Normal Speed: For step load current, recovery to regulation band within 50 microseconds.

OUTPUT IMPEDANCE:

Voltage Mode, Normal Speed: See table.

Voltage Mode, Fast Slewing: Above 1kc, add the reactive impedance of 500 microhenries.

OFFSET NULLING: The initial part of the input offset voltage and input offset current can be nulled with internal controls.

REFERENCES: Two: +6.2 volts and -6.2 volts; maximum current 1 milliampere.

PROGRAMMING: 1 mA control current, by resistance at 1000 ohms per volt. May be operationally controlled as an amplifier using voltage or current signals. Common positive.

AUTOMATIC CROSSOVER: Selects voltage regulation or current regulation operating mode automatically.

VIX* CIRCUIT: Voltage/Current mode indicators display operating conditions; also 115V AC control signal (0.5A max.)

REMOTE ERROR SENSING: Compensates up to 0.5V drop per output lead.

TEMPERATURE, AMBIENT OPERATING: -20°C to +55°C.

TEMPERATURE, STORAGE: -40°C to +85°C.

COOLING: Convection.

INPUT: 105-125 V AC or 210-250V AC (selected), 50-65 cps single phase. Approximately 4 amperes at 125V AC.

ISOLATION VOLTAGE: 1000 volts to chassis.

CONTROL RESOLUTION: Voltage: 0.01% 10-turn vernier control and 10 position selector. Current: 0.05% 10-turn control.

OVERSHOOT: (Turn-on/off): None above 10% voltage setting; negligible below 10% when preloaded to 10% minimum.

SERIES/PARALLEL: Series operation to rated isolation; also master/slave capability. Current limiting design permits self-determined parallel load sharing.

METERS: Suffix "M" designates a pair of 2½", 2% meters. Delete suffix "M" for unmetered unit.

TERMINALS: Safety (recessed) output connections on front panel; two multi-terminal barrier strips at the rear contain output, sensing and control functions. Fast slewing/normal strapping is internal.

DIMENSIONS: 5¼"H x 19"W x 16½"D (behind panel).

FINISH: Per FED. STD. 595. Color 26440, (light gray).

All terms used in the specifications are defined in the Kepco Glossary. Refer to Kepco's Catalog or Handbook.

Data subject to change without notice.
PATENT NOTICE: Applicable Patent Nos.
will be supplied on request.

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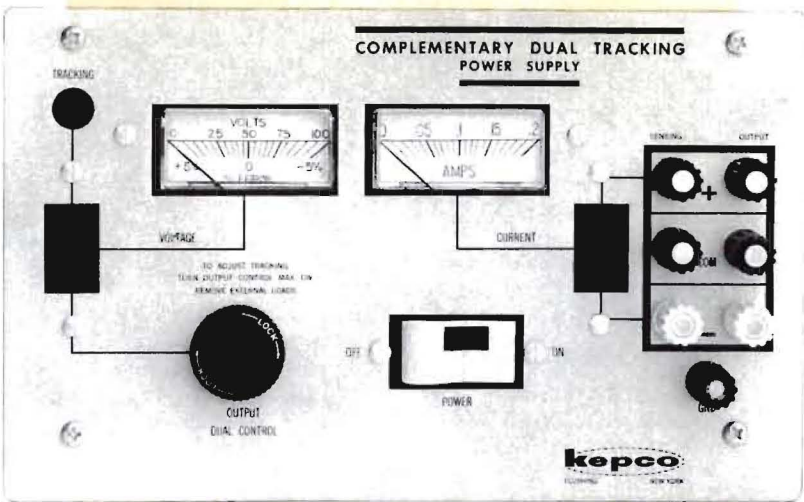
Cable: KEPPOPOWER NEWYORK





KEPCO
CDT
DUAL TRACKING
POWER SUPPLIES

- complementary or series output
- single control, adjustable tracking
- voltage, current and error metering



Model CDT 100-0.2M

MODEL	TWIN OUTPUTS*				INDIVIDUAL SUPPLIES			MAX. INPUT AMPS at 125 V AC	PRICE
	COMPLEMENTARY VOLTS	AMPS	SERIES VOLTS	AMPS	OUTPUT Ohms	IMPEDANCE + Microhenries			
CDT 15-1.5M	0-±15	0-±1.5	0-30	0-1.5	0.001	0.02	0.1+1μh	1.3	\$380.00
CDT 40-0.5M	0-±40	0-±0.5	0-80	0-0.5	0.008	0.02	0.1+1μh	0.8	380.00
CDT 100-0.2M	0-±100	0-±0.2	0-200	0-0.2	0.05	0.02	0.1+1μh	0.9	380.00

*Each Power Supply contains two sources with a common voltage control, may be used as complementary (plus and minus) supplies or in series for double voltage.

SPECIFICATION	VOLTAGE MODE	
	COMPLEMENTARY**	SERIES
OUTPUT RANGE	0 to +E ₀ and 0 to -E ₀	0 to twice E ₀
REGULATION, LINE	<0.005%	<0.005%
REGULATION, LOAD	<0.01% or 1mV*	<0.01% or 2mV*
STABILITY (8 hr)	<0.01% or 2mV*	<0.01% or 4mV*
TEMP. COEFFICIENT	<0.01% per °C	<0.01% per °C
RIPPLE, rms	<0.25mV	<0.5mV

*whichever is greater

**Specifications are for the individual supplies, changes in the master supply (plus output) are repeated 1:1 in the slave supply.

INPUT: 105-125V AC or 210-250V AC (selected) 50-440 cps.

TEMPERATURE, AMBIENT OPERATING: -20°C to +65°C.

TEMPERATURE, STORAGE: -40°C to +85°C.

COOLING: Convection.

ISOLATION VOLTAGE: 500 volts to chassis.

OUTPUT: The individual power supplies are wired in series, controlled with a single voltage control. They may be loaded in series or separately.

CONTROL RESOLUTION: <0.05%, 10 turn voltage control adjusts the output of the positive supply, designated "master", this voltage in turn controls the negative supply or "slave" in a 1:1 ratio. The two power supplies are connected in series.

TRACKING: ±5% range of adjustment is controlled by a recessed front panel control. Units can be adjusted to within ±0.5% using panel meter. Closer adjustment with external instrumentation.

PROGRAMMING: 1 milliamperere control current, or resistance: 1000 ohms per volt. Common positive.

VOLTAGE RECOVERY: (for step load current): <50 μseconds.

CURRENT LIMITING: Each supply is individually limited with a 10 to 105% range of adjustment.

REMOTE ERROR SENSING: Compensates for up to 0.5 volt drop per output lead.

METERS: Voltmeter monitors output of MASTER, or the difference between MASTER and SLAVE, displayed as a percentage error (range ±5%). Ammeter monitors current from either supply (selectable).

TERMINALS: Binding posts on the front panel for plus, common and minus outputs, also sensing terminals and separate ground. Barrier strip at the rear has duplicate output, sensing and control terminals.

DIMENSIONS: 5¼"H x 8½"W x 17¾"D (behind panel).

FINISH: Panel: Per FED. STD 595, color 26440, light gray. Case: Gray hammertone.

MOUNTING: Rack Adapters available.

Data subject to change without notice.
PATENT NOTICE: Applicable Patent Nos. will be supplied on request.

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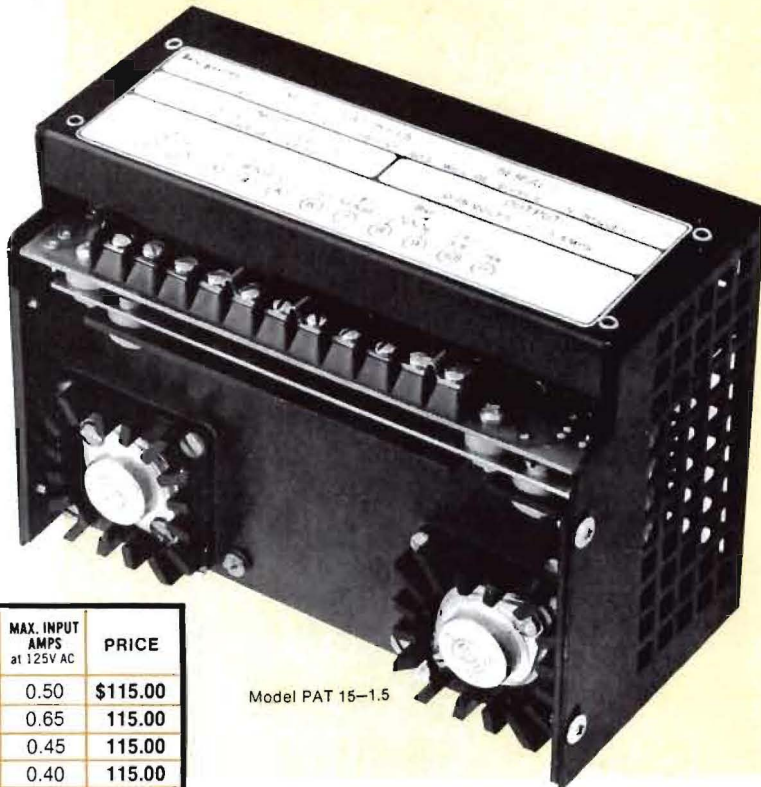
KEPCO

PAT

MODULAR

POWER SUPPLIES

- voltage/current regulation
- full range operationally programmable
- all silicon design



Model PAT 15-1.5

MODEL	DC OUTPUT RANGE		OUTPUT IMPEDANCE			MAX. INPUT AMPS at 125V AC	PRICE
	VOLTS	AMPS	Ohms DC-100cps	Microhenries 0.1-1kc	1-100kc		
PAT 7-2	0-7	0-2	0.0005	0.02	0.1+1	0.50	\$115.00
PAT 15-1.5	0-15	0-1.5	0.001	0.02	0.1+1	0.65	115.00
PAT 21-1	0-21	0-1	0.0025	0.02	0.1+1	0.45	115.00
PAT 40-0.5	0-40	0-0.5	0.008	0.02	0.1+1	0.40	115.00
PAT 72-0.3	0-72	0-0.3	0.025	0.02	0.1+1	0.45	115.00
PAT 100-0.2	0-100	0-0.2	0.050	0.02	0.1+1	0.45	115.00

SPECIFICATIONS	VOLTAGE MODE	CURRENT MODE** (External Sensing)
OUTPUT RANGE	0-100% E_O max.	1mA-100% I_O max.
REGULATION, LINE	<0.01%	<0.01% at rated sample**
REGULATION, LOAD	<0.01% or 1 mV*	<0.02% at rated sample**
STABILITY (8 HR.)	<0.01% or 2 mV*	<0.05% or 1 mA*
TEMP. COEFFICIENT	<0.01% per °C	<0.05% per °C
RIPPLE, rms.	<0.1 mV	<0.02% of I_O max.

*whichever is greater

**Rated sample is 1V DC across external current sampling resistor with external current control.

INPUT: 105-125V AC or 210-250V AC (selected), 50-440 cps single phase.

TEMPERATURE, AMBIENT OPERATING: Cased: -20 C to +71 C.

TEMPERATURE, STORAGE: -40 C to +85 C.

COOLING: Convection.

ISOLATION VOLTAGE: 500 volts to chassis.

PROGRAMMING: Approximately 1 mA control current, externally adjustable by resistance at ≈ 1000 ohms per volt. Specify suffix "R" to obtain model with integral $\pm 10\%$ control current adjustment. May be operationally controlled as an amplifier using voltage or current signals; common positive.

VOLTAGE RECOVERY (for step load current): <50 μ seconds.

CURRENT LIMITING: Adjustable from 10% to 105% of rated full current.

REMOTE ERROR SENSING: Compensates up to 0.5 volt drop per output lead.

OVERSHOOT (Turn-on/off): None above 25% voltage setting; negligible below 25% when preloaded to 10% minimum.

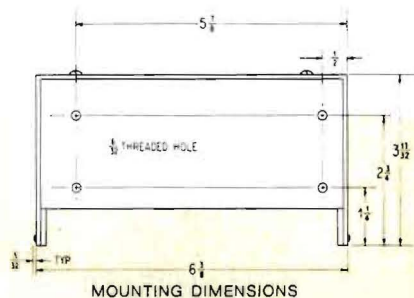
SERIES/PARALLEL: Series operation to rated isolation; also master/slave capability. Current limiting design permits self-determined parallel load sharing.

TERMINALS: All input, output and control connections are made via a multi-terminal barrier strip.

DIMENSIONS: Cased: 3 $\frac{1}{2}$ "H x 6 $\frac{1}{2}$ "W x 4 $\frac{3}{4}$ "D.

FINISH: Black anodized aluminum.

MOUNTING: Rack Adapters available.



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